WHAT SHOULD BE DONE IN THE CONTROL OF DEGENERATIVE DISEASES?

FREDERICK S. CRUM, PH.D.,

Assistant Statistician, The Prudential Insurance Company of America, Newark, N. J.

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Dr. Crum's six lines of attack are: bettered scientific methods in infant and pre-school care; extension of school hygiene, medical inspection and physical training, more intensive health education of the people and the extension of industrial sanitation and industrial hygiene.

AS a preliminary to the discussion of this problem, it is desirable that a brief statement be made as to the philosophy of disease origin and causation. The life of a complex organism has been defined as the sum of all those interactions which take place between the various cells constituting the organism and their several environments. All disease is ultimately an improper interaction of cells and their environment. Cell environment may be morbidly modified or affected in various ways and Dr. Campbell* enumerates these under nine headings, as follows:

1. By insufficient, excessive or improper ingesta.
2. By disease of the blood-plasma-forming tissues.
3. By inhalation of insufficient oxygen or nocuous matters; mechanical, germinal or gaseous; also imperfect exhalation of lung excreta. Temperature and dampness of atmosphere also may exert ill effects on the body.
4. By disease of the blood-cell-forming organs.
5. By disease of the respiratory organs.
6. By disease of the vascular system; heart, blood-vessels and their nervous regulating systems.
7. By disease of the excretory organs.
8. By direct nervous influence upon cells.
9. By injurious influence upon the exterior of the body, e. g., violence, extremes of temperature, filth, parasites.

Dr. Campbell also well defines disease as "an abnormal mode of life."

In very recent times emphasis has properly been placed upon the fact that all of the various parts of the body are so closely connected and interrelated that it is almost impossible for one part, organ or function to get out of order without throwing the whole machinery out of gear. To illustrate, a decayed tooth may cause neuralgia, dyspepsia, acute rheumatism or other serious disease or disorder.

In considering the origin of disease, therefore, it is necessary to keep in mind that attacks of sickness or injuries received in early life may often result in future disease. It is not rare that the seed of disease is planted by some attack in infancy or childhood and, after lying dormant for years, develops in middle life or old age.

It is important also to keep in mind that many diseases which formerly were considered as confined to one organ are seldom so limited, for numerous autop-

*The Causation of Disease, p. 20, by Harry Campbell, M.D., B.S. (Lond.), London, 1889.

sies have demonstrated beyond doubt that there are lesions of other organs that are just as definite as those of the part which once was quite generally considered to be the sole seat of origin. At the same time many of the lesions are of such a nature as to render it certain that they existed long before the onset of the fatal attack.

In considering therefore, the sum of those material conditions from which disease or diseases necessarily follow, our search must be directed to the material conditions out of which the disease or diseases may have arisen.

DISEASE CLASSIFICATION.

Dr. Meigs, Physician to the Pennsylvania Hospital,* has very clearly set forth the fact that many of the present disease classifications are faulty in that they do not follow any consistent principle. He also quite properly, I think, classifies all diseases as falling into one of two groups, those of extrinsic origin and those of intrinsic origin. He also brings out very clearly the fact that the diseases of extrinsic origin are generally those common to early life and are quite rare in old age. The diseases of extrinsic origin are smallpox, measles, whooping cough, diphtheria, etc. The diseases of intrinsic origin, on the other hand, are quite rare in early life and very common to old age. An illustration of this is cysts in the kidneys. There are, of course, a number of diseases which at the present time cannot be definitely assigned as being of extrinsic or intrinsic origin largely because such diseases are not at present thoroughly enough understood. It is also possible that some diseases may be of dual origin, that is, in part extrinsic and in part intrinsic. Cancer is probably such a disease.

Dr. Meigs has pointed out that if the subject of disease origin and causation is considered from the standpoint of pathology and the conditions of the tissues examined, the meaning of the assertion that youth and age may be mingled will be understood and it will be perceived that disease can so far change a person young in years as to produce all the conditions which under natural circumstances are found only in the old.

Recent advances in medical science and practice have developed a wider knowledge of the fact that persons affected with chronic diseases, such as certain chronic lung diseases, nephritis, etc., may have their lives prolonged for several years by proper curative treatment and personal care. The same truth is even more susceptible of demonstration in instances of chronic heart diseases. This fact has been brought out very clearly by Dr. Oliver T. Osborne in his little book entitled "Disturbances of the Heart; Discussion of the Treatment of the Heart in Its Various Disorders."†

With these preliminary statements we may ask the question, have the degenerative diseases increased? For the purposes of this discussion I am limiting the term degenerative diseases to include chronic valvular diseases of the heart, fatty degeneration of the heart, chronic myocarditis, chronic dilation of the heart, heart disease of rheumatic origin, certain types of nervous diseases such as apoplexy and chronic nephritis, or Bright's disease. For the purposes of this discussion it is not of prime importance to determine positively whether or not there has been an increase in the degenerative diseases, so-called. There are good reasons to believe that there have been exaggerated statements made as to the increase in this class or group of diseases and there are good reasons to believe from a very extended insurance mortality experience based upon millions of lives and hundreds of thousands of deaths that there has been no very considerable increase in the mor-

*The Origin of Disease, p. 2, by Arthur V. Meigs, M.D., Philadelphia, 1897.

†The American Medical Association, 1913.

tality from this group of diseases in recent years in this country.* Entirely aside, however, from that question there are numerous facts in mortality experience both general and special, in proof that there is at the present time a very large and probably preventable mortality at premature ages in this group of diseases. There are many difficulties in the way of determining whether or not there has been an increase in the mortality from these diseases, not the least of which is our imperfect nosology and the resulting imperfect and changing classification of diseases or causes of deaths as reported by the United States Census Bureau, State health authorities, etc. One illustration will suffice to bring out this fact. In the four States of Connecticut, Massachusetts, New Hampshire and Rhode Island, combined, in the period 1889 to 1891 and at ages 60-69, 2.6 per cent of the total mortality was assigned to the indefinite term "old age." In the period 1909-1911, same age group, the percentage was only 0.6. The similar comparison, ages 70 to 79, was 11 per cent for the earlier period as against 3.2 per cent for the later period. Again, the similar comparison for ages 80 and over gives 38 per cent for the earlier period as against 17.6 per cent for the later period. These facts illustrate the danger of drawing conclusions as to the increase of degenerative diseases on the basis of mortality returns of the registration area of the United States, much, if not all of which apparent increase is due to the change in titles and reassignments of causes, particularly in the comparatively recent period during which there has been anything like accurate or complete registration of deaths even in the registration area of the United States. After a very extended and careful investigation of the subject I cannot but conclude, as many other investigators have, that although there may have been an increase in the mortality from degenerative diseases in recent years, such increase has not been relatively important and, indeed, if the classification could be made with absolute accuracy, there is a strong probability that the increase has been very small and possibly *nil.*

For the present we can probably dismiss as of no practical value the much heralded, alleged discovery by Dr. Serge Voronoff. Judging from analogy and the consensus of opinion of the most able and experienced medical and surgical experts, there is no very strong probability that the fountain of youth will be found in an "interstitial" or any other gland or part of the human body. As "The Cincinnati Post" in an editorial of October 23, 1919, states: "While positive as to the restoration of vim, vigor, etc., Dr. Voronoff is careful to state that gray hair does not return to black, new teeth don't sprout and weak eyes do not become strong. White-headed, toothless and wrinkled, the old man is just filled chock full of youthful gaiety—everything in the way of youth except the looks." Apropos, it is interesting to note that Dr. W. J. Mayo is reported to have recently stated before the American College of Surgeons that some fifteen years have been added to the span of human life since the Civil War and he has predicted, according to report, that within a short period, or within twenty years, there are likely to be from ten to fifteen more years added to the span of human life in the United States. This addition to our years, however, according to Dr. Mayo, will be by the well-known methods of life conservation rather than by any such remarkable, alleged discoveries as that claimed by Dr. Voronoff.

Principal Causes of Premature Death from Degenerative Diseases. On the basis of the philosophical theories of Drs. Campbell, Meigs and others, which theories are at least partially confirmed by an enormous body of reliable experience, we may briefly enumerate some of the principal causes of these premature deaths as follows: Focal infections, in-

*See Appendix A.

cluding mouth infection; faulty habits, such as over-indulgence in alcohol, tobacco, sexual excesses, etc.; lack of exercise leading to constipation and other serious contributory causes of chronic affections; dietetic excesses, such as over-indulgence in food, undernourishment, malnutrition, unbalanced rations, etc.; overweight, physical and mental strain, etc.

It would be impossible to dwell at length upon any one or all of these and other causes in this brief paper; I will, therefore, confine myself to the one item, focal infections. Dr. W. J. Mayo is reported to have said before the recent Congress of the American College of Surgeons that, "Better care of focal infections in the earlier decades will prevent many deaths in later life." Of course, I assume that Dr. Mayo meant postpone instead of "prevent." It is a well known fact, which has recently received considerable emphasis, that good dentistry will prevent many serious diseases, some of which are likely to become chronic. In fact, Dr. W. J. Mayo in this same address is reported to have said that good dentistry has eliminated a percentage of cancers of the jaw due to the irritation of defective teeth. In this connection I may also mention the recently published industrial mortality experience of the Metropolitan Life Insurance Company in which it appears that there was a quite significant increase in organic heart disease, pulmonary tuberculosis and puerperal diseases during the recent epidemic period of influenza when the mortality experience of that company for the period October to December, 1918, is compared with the similar period for the year 1917.*

STATISTICS.

We need much more full and complete statistical information as to the effect of previous diseases and injuries on mortality. There is every prospect that such statistics will be available in large numbers in the near future. Industrial insurance companies, hospitals, employees benefit associations, experiments like the Framingham Health and Tuberculosis Demonstration and the Cincinnati Unit Plan, the statistics of school medical inspection and the statistical data which are being collected by the Life Extension Institute are instances, among others, of the possibilities and probabilities in this direction.

METHODS OF CONTROL OF DEGENERATIVE DISEASES.

I have nothing new to propose in the way of methods of controlling degenerative diseases. I believe that the methods which must be followed are practically all in use somewhere and to some extent at the present time. It is only a matter therefore, of coordinating and extending these methods on a more wide and practically universal scale, and if this is done, unquestionably a large proportion of the premature deaths from the so-called degenerative diseases will be postponed in many cases for several years. In fact I believe that the considerable reduction in industrial accidents which has already taken place; the reduction in infant mortality and in certain diseases of early childhood, particularly diphtheria; and the reduction of the mortality and morbidity from certain diseases of middle life, such as typhoid fever and pulmonary tuberculosis, are certain to reflect favorably upon the so-called degenerative diseases in the near future if such has not already been the case.

In conclusion, let me enumerate very briefly some of the principal methods which, in my opinion, will go a long way towards controlling the premature mortality from degenerative diseases if they are extended and correlated under some well-devised system of Federal and State Health Administration such as has recently been put into effect in Great

*Influenza Mortality Among Wage-Earners and Their Families, by Frankel and Dublin, Amer. Jour. Pub. H., October, 1919.

Britain and Canada, through the establishment of Ministries of Health:

1. An extension of the most scientific methods of infant care and medical supervision.

2. An extension of the most scientific methods of care and supervision of children of pre-school age.

3. An extension of school hygiene, in which shall be included medical inspection and physical training of children in the grade schools, high schools and institutions of higher learning. This also includes provision for school lunches wherever there is need for the same.

4. A continued and even more intensive and wide-spread scientific educational propaganda in the principles of good personal habits, including cleanliness, diet, exercise, proper recreation, etc. This education should also include instruction in the principles of personal safety and of industrial, public, and home accident prevention. The need for periodical dental and other physical examination should be a part of such propaganda.

5. An extension of the work, now so well done in many large industrial plants, of industrial sanitation. This should include factory good housekeeping, which in turn includes cleanliness, good lighting, good ventilation, the elimination so far as possible of dusts, fumes, gases, industrial poisons, etc.

6. Industrial hygiene. A very considerable emphasis has been placed upon this factor in recent years. The principles have already been worked out quite satisfactorily in some countries and in many plants and establishments in this country. The factors in industrial hygiene are numerous. Undue fatigue should be avoided; there should be provision for physical examinations of employees and for industrial clinics; recreational facilities should be made available to employees wherever possible and industrial cafeterias have been found of inestimable value in certain plants where good eating facilities are otherwise difficult to obtain.

I have not attempted to cover this subject with any completeness; that, would be utterly impossible in so brief a paper. I have only attempted to open the subject and trust that it will receive amplification from the discussions that may follow.

There are added to the paper a few illustrative statistics and a brief bibliography of some of the more important recent books and pamphlets dealing with this large problem.

APPENDIX A

Mortality from Degenerative Diseases Ages 40 and Above*
Industrial Mortality Experience
The Prudential Insurance Company of America
1911-1918

Years	Approximate Number Persons Exposed to Risk, Ages 40 and Over	Number of Deaths	Death Rate Per 10,000 Persons
1911	1,690,902	16,377	96.85
1912	1,807,395	17,079	94.50
1913	1,944,160	18,103	93.11
1914	2,046,162	18,793	91.85
1915	2,182,878	21,878	100.23
1916	2,336,044	23,966	102.56
1917	2,484,131	25,349	102.04
1918	2,712,165	25,058	92.39

The statistics of the Metropolitan Life Insurance Company's experience may be found in "Mortality Statistics of Insured Wage-Earners and Their Families." The data, however, are not given by age in such manner as to make possible a comparison of 1911 with 1917. The death rates from Organic Heart Diseases, Apoplexy and Cerebral Hemorrhage, Diabetes and Bright's Disease combined, all ages and both sexes, were as follows:

Death Rate Per 10,000 Persons Insured
All Ages
Degenerative Diseases
Metropolitan's Industrial Experience

1911	31.43	1915	31.60
1912	32.72	1916	32.38
1913	31.77	1917	31.98
1914	31.69		

In these two mortality experiences, which represent several millions of lives exposed to risk, there is no conclusive evidence that the so-called degenerative diseases have increased in prevalence or fatality in recent years in the United States.

*Including Organic Heart Disease, Apoplexy and Cerebral Hemorrhage, Diabetes and Bright's Disease.

APPENDIX B

A Partial Bibliography

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